

## Section 8-2: Solve Systems of Equations Graphically

**By the end of this lesson, you should be able to answer:**

- How do you determine if an ordered pair is a solution of a system?
- How do you solve systems of linear equations graphically?

**Where you might see this in the real world:**

- Sports, safety, economics

Define the following terms:

1. System of equations
2. Solution of a system

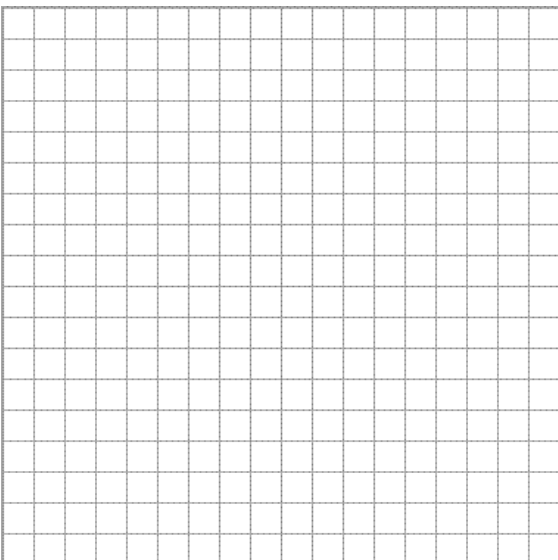
Systems of equations are groupings of equations. When we are dealing with systems of equations, we are going to be seeing different ways of solving them. The first method we will be looking at will be graphing the system.

When we are finding the solution to the system, we are looking for the ordered pair that satisfies both equations. The ordered pair will occur at the intersection of the two points. This method will work well when the intersection point is an ordered pair consisting of two integers. It is also very important to be very exact in our graphing, as a sloppy graph will lead to an incorrect answer.

Example 1: Tell whether the ordered pair (3, 4) is a solution to the given system:

$$\begin{cases} x + y = 7 \\ 2x - y = 10 \end{cases}$$

a. Check by graphing

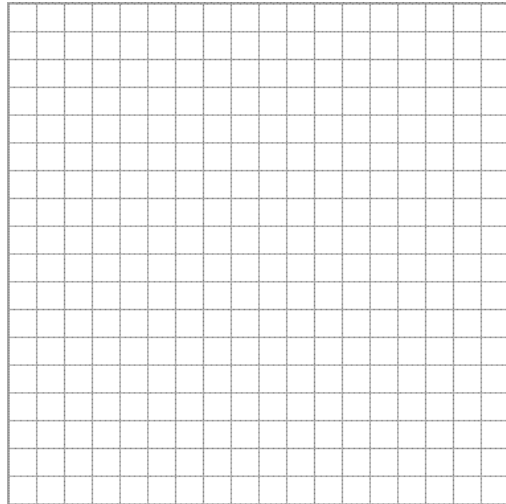


b. Check by substituting the ordered pair into the equations

In example 1, we were able to check our given solution by both graphing and plugging in the values of  $x$  and  $y$ . **YOU WILL ALWAYS NEED TO CHECK YOUR SOLUTION BY PLUGGING IT BACK INTO ALL EQUATIONS IN THE SYSTEM!!!**

Example 2: Solve the system by graphing.

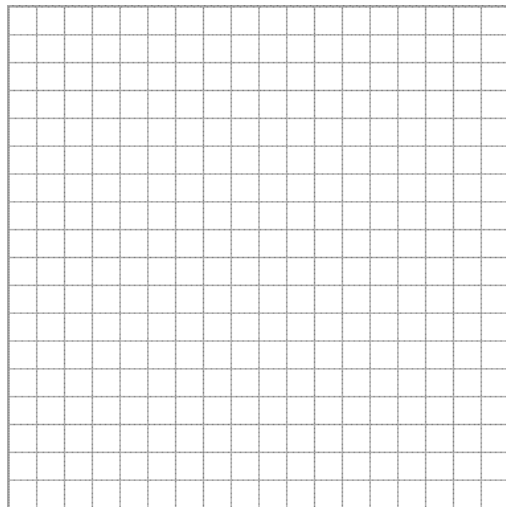
$$\begin{cases} 2x - y = 4 \\ x + y = 5 \end{cases}$$



We can also apply systems to problems that deal with other mathematical concepts such as area and other geometric principles.

Example 3: Graph the system and determine the area of the triangle formed.

$$\begin{cases} y = x \\ y = -3 \\ y + x = 2 \end{cases}$$



Quick question: If the equations of a system are in the slope-intercept form, how can you tell without graphing if the system has a solution?

Problem Set:

"IF THE ONLY TOOL YOU HAVE IS A HAMMER, YOU TEND TO SEE EVERY PROBLEM AS A NAIL." - ABRAHAM MASLOW